

WE CLAIM AS OUR INVENTION:

1. A device for lifting magnetizable carrier particles, comprising:
a collecting element having a cover which is rotatable around a stationary stator;
the stator comprises at least one magnet having a pole arranged relative to the cover such that the magnet's magnetic field attracts ferromagnetic carrier particles that are located on a carrier at a distance of an air gap; and
a surface of the cover comprises at least one screw-thread-like spiral which, given rotation of the cover, moves the carrier particles in an axial direction relative to the cover.
2. The device according to claim 1 wherein a surface of the carrier carries a mixture made of toner particles and ferromagnetic carrier particles, and the spiral has at least in a section at least one of a shape of a channel and an elevation.
3. The device according to claim 1 wherein a discarding device is arranged on a circumferential surface of the cover, the cover being designed as a non-magnetic hollow cylinder that conveys the incoming carrier particles in an axial direction relative to the cover.
4. The device according to claim 3 wherein a groove on the cover running in an axial direction is provided as said discarding device.

5. The device according to claim 3 wherein an elevation on the cover running in an axial direction of the cover is provided as said discarding device.

6. The device according to claim 1 wherein a discarding device is arranged opposite a predetermined catch location for carrier particles on the cover.

7. The device according to claim 1 wherein a first spiral according to a type of right-handed thread is arranged on the cover, and a second spiral according to a type of left-handed thread is arranged on the cover, a discarding device being arranged in an area in which the first spiral and the second spiral meet.

8. The device according to claim 1 wherein the stator comprises two magnets whose poles face outwards in a radial direction and have different polarity.

9. The device according to claim 8 where one pole of the magnet faces the mixture made of toner particles and magnetizable carrier particles, and both magnet poles have a predetermined angular separation from one another.

10. The device according to claim 9 wherein the angle of separation is approximately 90°.

11. The device according to claim 9 wherein the magnet facing the mixture made of toner particles and magnetizable carrier particles is designed such that it transports magnetizable carrier particles to the surface of the cover, and the other magnet is designed such that, given rotation of the cover, it conveys attracted magnetizable carrier particles in the axial direction.

12. The device according to claim 1 wherein at least one of a direct voltage and an alternating voltage is acting along the cover whose electrical field effects the toner particles.

13. The device according to claim 12 wherein the direct voltage is overlaid by the alternating voltage.

14. The device according to claim 1 wherein the cover is coated with anti-adhesive material in order to ease removal of deposited toner particles.

15. The device according to claim 1 wherein the spiral has a channel-like depression with a width and a depth dependent on a size of the magnetizable carrier particles.

16. The device according to claim 1 wherein the device is a developer station in a printer or copier.

17. The device according to claim 16 wherein the cover is arranged at a distance of an air gap near a surface of an applicator roller coated with a mixture made of toner particles and magnetizable carrier particles.

18. The device according to claim 1 wherein the cover is arranged opposite an intermediate carrier ribbon which carries a mixture made of toner particles and magnetizable carrier particles, and where an air gap exists between the cover and the mixture.

19. A method for lifting magnetizable carrier particles, comprising the steps of:

rotating a cover of a collecting element around a stationary stator, and wherein the stator comprises at least one magnet having a pole arranged approximately radial to the cover and a magnetic field which attracts ferromagnetic carrier particles located on a carrier at a distance of an air gap; and

providing a surface of the cover with at least one screw-thread like spiral so that, given rotation of the cover, the carrier particles move in an axial direction relative to the cover.

20. The method according to claim 19 wherein a surface of the carrier carries a mixture made of toner particles and ferromagnetic carrier particles, and the spiral has at least in sections at least one of a shape of a channel and an elevation.

21. The method according to claim 19 wherein a discarding device is arranged on a circumferential surface of the cover designed as a non-magnetic hollow cylinder that conveys incoming carrier particles in an axial direction relative to the cover.

22. The method according to claim 21 wherein the discarding device is arranged opposite a predetermined catch location for carrier particles.

23. The method according to claim 21 wherein a first spiral according to a type of right-handed thread is arranged on the cover, and a second spiral according to a type of left-handed thread is arranged on the cover, and wherein the discarding device is arranged in an area in which the first spiral and the second spiral meet.

24. The method according to claim 19 wherein the stator comprises two magnets whose poles face outwards in a radial direction and have different polarity.

25. The method according to claim 19 wherein the magnet faces a mixture made of toner particles and magnetizable carrier particles and is designed such that it transports magnetizable carrier particles to the surface of the cover, and another magnet is designed such that given rotation of the cover, the another magnet conveys attracted magnetizable carrier particles in the axial direction.

26. The method according to claim 19 wherein the method is part of a developer station for a printer or copier.

27. The method according to claim 26 wherein the cover is arranged at a distance of an air gap near a surface of an applicator roller coated with a mixture made of toner particles and magnetizable carrier particles.

28. The method according to claim 19 wherein the cover is arranged opposite an intermediate carrier ribbon which carries a mixture made of toner particles and magnetizable carrier particles, an air gap being provided between the cover and the mixture.

29. A device for lifting magnetizable carrier particles, comprising:
a collecting element having a cover which is rotatable around a stator;
the stator comprises at least one magnet arranged relative to the cover such that the magnet's magnetic field attracts ferromagnetic carrier particles that are located on an adjacent carrier; and

a surface of the cover comprises at least one spiral which, given rotation of the cover, moves the carrier particles in an axial direction relative to the cover.

30. A method for lifting magnetizable carrier particles, comprising the steps of:

rotating a cover of a collecting element around a stator, and wherein the stator comprises at least one magnet arranged approximately radial to the cover and a magnetic field which attracts ferromagnetic carrier particles located on an adjacent carrier; and

providing a surface of the cover with at least one spiral so that, given rotation of the cover, the carrier particles move in an axial direction relative to the cover.